



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/331,763	06/25/1999	KAZUTO NISHIDA	177/526327	2049

7590 07/18/2002

WENDEROTH LIND & PONACK
2033 K STREET NW
SUITE 800
WASHINGTON, DC 20006

EXAMINER

MEREK, JOSEPH C

ART UNIT

PAPER NUMBER

3727

DATE MAILED: 07/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/331,763

Applicant(s)

NISHIDA, KAZUTO

Examiner

Joseph C. Merek

Art Unit

3727

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 39-88 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 39-88 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 14, 16.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 3727

DETAILED ACTION

Specification

1. The amendment filed 4/25/02 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: there is no support for the softening of the circuit board.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 77, 80, 83, and 86-88 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Regarding claims 86-88, it has not been adequately disclosed that the heat applied during the bonding process has any softening effect on the circuit board. The specification previous to the amendment of 4/25/02 did not state that the circuit board is softened during the heating process. The specification only stated that

Art Unit: 3727

the resin was softened by the heating process. There is no support for this limitation in the original specification. Regarding claims 77, 80, and 83, there is no support for the correcting the warping of the electronic component. This is a new matter rejection.

Claim Rejections - 35 U.S.C. § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

5. Claims 39-42, 45, 48, 54, 58-76, 77, and 80 are rejected under 35 U.S.C. 102(e) as being anticipated by Murakami. Regarding claim 39 and 41, see Col. 5, lines 46-51 where it is stated that the device is pressed under heating. These actions occur at the same time. The pressure is at least 20gf per bump. As the bumps are deformed as the leveling occurs. The resin is a solid since it is without internal cavity. (See Merriam-Webster's Collegiate Dictionary, Page 1118 reference enclosed) Regarding claim 40, the pressing is towards the circuit board. Regarding claims 42 and 45, the resin on the board is considered a sheet and is an adhesive. Regarding claim 48, see Fig. 2A, where the thickness of the resin sheet prior to aligning, is smaller than the width of the connection between the electrode and the electronic component. Regarding claim 54, the resin sheet is on a side of the circuit board. Regarding claims 58-76 and 82, in light of

Art Unit: 3727

applicants arguments that the claim is directed to the apparatus and not the circuit board, component, or the adhesive sheet, the reference meets the claims. Regarding claims 77 and 80, the pressing will inherently perform the claimed function of correcting any warping of the electronic component and these actions occur at approximately the same time.

6. Claims 39-42, 45-48, 54, 58-76, 77, and 80 are rejected under 35 U.S.C. 102(b) as being anticipated by Eldring (DE 195 35 282). Regarding claims 39, see Figs. 40-44, where the process is shown. The adhesive 17 is solid for the reasons stated in Murakami above. Regarding claim 40, the pressing is towards the circuit board. Regarding claims 42 and 45, the resin on the board is considered a sheet and is an adhesive. Regarding claim 48, see Fig. 43, where the thickness of the resin sheet prior to aligning, is smaller than the width of the connection 4 between the electrode and the electronic component. Regarding claim 54, the resin sheet is on a side of the circuit board. Regarding claims 58-76 and 82, in light of applicants arguments that the claim is directed to the apparatus and not the circuit board, component, or the adhesive sheet, the reference meets the claims. Regarding claims 77 and 80, the pressing will inherently perform the claimed function of correcting any warping of the electronic component and these actions occur at approximately the same time.

Claim Rejections - 35 U.S.C. § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 3727

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542. Regarding claim 43, Murakami does not teach the sheet being thicker than the gap. Tsukagoshi et al '542, as seen in Figs. 8 and 9, teaches the sheet being thicker than the gap. It would have been obvious to employ the thicker sheet of Tsukagoshi et al '542 in the method of Murakami to provide a stronger bond or more bonding material. See Fig. 8 of Tsukagoshi et al '542 where the bonding material 16 is up the sides of the component.

9. Claims 44, 46, 47, 56, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tang et al. Regarding claim 44, Murakami does not teach the use of a sheet of anisotropic thermosetting resin. Tang et al teaches bonding a component to a circuit board using a sheet of anisotropic thermosetting resin. It would have been obvious to employ the resin of Tang et al in the method of Murakami for compensating in deviations in the planarity of the board as taught by Tang et al. Regarding claim 46, the particles of Tang et al are conductive. Regarding claim 47, Tang et al teaches a conductive coating of nickel and gold but does not teach it as the conductive coating for the particles. It would have been obvious to employ it for the particles to eliminate the need for another or different coating for the particles.

10. Claims 49 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tang et al as applied to claim 48 above, and further in view of Matsumoto et al '069. Regarding claim 48, the modified method of Murakami does not teach the conductive

Art Unit: 3727

adhesive applied to the bumps. Matsumoto et al '069, teaches the use of conductive adhesive on the bumps. It would have been obvious to employ the conductive adhesive of Matsumoto et al '069 in the modified method of Murakami to provide a better or stronger bond. Regarding claim 53, the bumps are forced through the resin and the paste as part of the bumps are hardened prior to adhesion to the board.

11. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami. Regarding claim 50, Murakami does not teach the use of flux. Official notice is taken that it is well known to apply flux to metal joints. It would have been obvious to employ flux to the electrodes of Murakami to provide a better bond.

12. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Gruppen-Shemansky et al. Murakami does not teach the sheet having holes corresponding to the electrodes and the holes filled with conductive particles. Gruppen-Shemansky et al as seen in Figs. 1-3, teaches a sheet 12 of adhesive with holes filled with conductive particles. It would have been obvious to employ the sheet of Gruppen-Shemansky et al in the method of Murakami to provide a stronger bond.

13. Claim 52, 83, 84, and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Gruppen-Shemansky et al and further in view of Tsukagoshi et al '542 and Matsubara et al. Murakami does not teach the sheet having holes corresponding to the electrodes and the holes filled with conductive particles. Gruppen-Shemansky et al as seen in Figs. 1-3, teaches a sheet 12 of adhesive with holes filled with conductive particles. It would have been obvious to

Art Unit: 3727

employ the sheet of Gruppen-Shemansky et al in the method of Murakami to provide a stronger bond. The modified method of Murakami does not teach the use of large particles or the ultrasonic vibrations. Tsukagoshi et al '542, teaches the use of large particles. It would have been obvious to employ the particles of Tsukagoshi et al '542 in the method of Murakami to provide spacing. Matsubara et al teaches the use of ultrasonic vibrations in the bonding step. It would have been obvious to employ the vibrations of Matsubara et al in the method of Murakami to provide a better bond. Regarding claim 83, these actions occur at approximately the same time. The pressing occurs while heating. The pressing provides the warping correction. Regarding claim 84, the modified process of Murakami discloses the claimed invention except for specific temperature range of 140 to 230 degrees C and the time being less than 20 seconds. It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the temperature and heating time, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Moreover, Tsukagoshi et al '542 as seen in claims 3 and 4, that the adhesive has a thermal activation temperature of 70 to 200 degrees C. Regarding claim 88, the modified process of Murakami teaches that the heat hardens the resin to produce the bond but does not teach that the heat softens the resin to produce the bonding. Tsukagoshi et al '542, as seen in Col. 12, lines 27-33 and Col. 12, lines 46-60, teaches that the resin is a sheet prior to heating and is made fluid to provide the bonding. It would have been obvious to employ the resin of Tsukagoshi et al '542 in the process of

Art Unit: 3727

Murakami to provide an alternative resin. Moreover, Tsukagoshi et al teaches that the resin can be initially hard or initially soft depending upon the type chosen.

14. Claim 85 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Grupen as applied to claim 52 above, and further in view of Tatusko et al. Regarding claim 85, Murakami, as seen in Col. 4, lines 26-28, teaches that the circuit board is a laminate plate with epoxy-containing material but does not teach the glass cloth or the copper cladding. Tatusko et al teaches that glass cloth can be used in an epoxy circuit board and that the cladding is typically copper. It would have been obvious to employ the glass cloth of Tatusko et al in the board of Murakami to reinforce the board and it would have been obvious to employ the copper to provide a good conducting material.

15. Claims 78 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami. Regarding claims 78 and 81, Murakami discloses the claimed invention except for specific temperature range of 140 to 230 degrees C and the time being less than 20 seconds. It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the temperature and heating time, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

16. Claims 79 and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tatusko et al (US 3,777,220). Regarding claims 79 and 82, Murakami, as seen in Col. 4, lines 26-28, teaches that the circuit board is a laminate plate with epoxy-

Art Unit: 3727

containing material but does not teach the glass cloth or the copper cladding. Tatusko et al teaches that glass cloth can be used in an epoxy circuit board and that the cladding is typically copper. It would have been obvious to employ the glass cloth of Tatusko et al in the board of Murakami to reinforce the board and it would have been obvious to employ the copper to provide a good conducting material.

17. Claims 86 and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al. Regarding claims 86 and 87, Murakami teaches that the heat hardens the resin to produce the bonding but does not teach that the heat softens the resin to produce the bonding. Tsukagoshi et al, as seen in Col. 4, lines 43-66, teaches that the resin is hard at ordinary temperatures and then softens upon heating to provide the bonding. It would have been obvious to employ the resin of Tsukagoshi et al in the process of Murakami to provide an alternative resin. Moreover, Tsukagoshi et al teaches that the resin can be initially hard or initially soft depending upon the type chosen.

18. Claim 39-43, 45, 48, 54, 58-76, 77, 78, 80, 81, 86, and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542. Regarding claims 39-43, 45, 48, 54, 58-76, 77 and 80, to the degree that the resin has to be in a sheet form and softened by the heating prior to bonding, Tsukagoshi et al '542, teaches that the resin can be a liquid or in a sheet form. It would have been obvious to employ the sheet form of resin in the process of Murakami since it is taught by Tsukagoshi et al '542 that either form of adhesive is acceptable. Regarding claims 78 and 81, the modified method of Murakami discloses the

Art Unit: 3727

claimed invention except for specific temperature range of 140 to 230 degrees C and the time being less than 20 seconds. It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the temperature and heating time, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Regarding claims 86 and 87, the modified process Murakami teaches that the heat softens the resin to produce the bonding. The resin is in sheet form initially and then softened to produce bonding.

19. Claims 44, 46, 47, 56, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 as applied to claim 39 above and further in view of Tang et al. Regarding claim 44, the modified process of Murakami does not teach the use of a sheet of anisotropic thermosetting resin. Tang et al teaches bonding a component to a circuit board using a sheet of anisotropic thermosetting resin. It would have been obvious to employ the resin of Tang et al in the method of Murakami for compensating in deviations in the planarity of the board as taught by Tang et al. Regarding claim 46, the particles of Tang et al are conductive. Regarding claim 47, Tang et al teaches a conductive coating of nickel and gold but does not teach it as the conductive coating for the particles. It would have been obvious to employ it for the particles to eliminate the need for another or different coating for the particles.

20. Claims 49 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view Tsukagoshi et al '542 and Tang et al as applied to claim 48 above, and further

Art Unit: 3727

in view of Matsumoto et al '069. Regarding claim 48, the modified method of Murakami does not teach the conductive adhesive applied to the bumps. Matsumoto et al '069, teaches the use of conductive adhesive on the bumps. It would have been obvious to employ the conductive adhesive of Matsumoto et al '069 in the modified method of Murakami to provide a better or stronger bond. Regarding claim 53, the bumps are forced through the resin and the paste as part of the bumps are hardened prior to adhesion to the board.

21. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542. Regarding claim 50, the modified process or method of Murakami does not teach the use of flux. Official notice is taken that it is well known to apply flux to metal joints. It would have been obvious to employ flux to the electrodes of Murakami to provide a better bond.

22. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 and further in view of Gruppen-Shemansky et al. The modified process or method of Murakami does not teach the sheet having holes corresponding to the electrodes and the holes filled with conductive particles. Gruppen-Shemansky et al as seen in Figs. 1-3, teaches a sheet 12 of adhesive with holes filled with conductive particles. It would have been obvious to employ the sheet of Gruppen-Shemansky et al in the method of Murakami to provide a stronger bond.

23. Claim 52, 83, 84, and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 and Gruppen-Shemansky et al and further in view of

Art Unit: 3727

Matsubara et al. Murakami does not teach the sheet having holes corresponding to the electrodes and the holes filled with conductive particles. Gruppen-Shemansky et al as seen in Figs. 1-3, teaches a sheet 12 of adhesive with holes filled with conductive particles. It would have been obvious to employ the sheet of Gruppen-Shemansky et al in the method of Murakami to provide a stronger bond. The modified method of Murakami does not teach the use of large particles or the ultrasonic vibrations. Tsukagoshi et al '542, teaches the use of large particles. It would have been obvious to employ the particles of Tsukagoshi et al '542 in the method of Murakami to provide spacing. Matsubara et al teaches the use of ultrasonic vibrations in the bonding step. It would have been obvious to employ the vibrations of Matsubara et al in the method of Murakami to provide a better bond. Regarding claim 83, these actions occur at approximately the same time. The pressing occurs while heating. The pressing provides the warping correction. Regarding claim 84, the modified process of Murakami discloses the claimed invention except for specific temperature range of 140 to 230 degrees C and the time being less than 20 seconds. It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the temperature and heating time, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Moreover, Tsukagoshi et al '542 as seen in claims 3 and 4, that the adhesive has a thermal activation temperature of 70 to 200 degrees C. Regarding claim 88, the modified process of Murakami teaches that the heat hardens the resin to produce the bond but does not teach that the heat softens the resin to produce

Art Unit: 3727

the bonding. Tsukagoshi et al '542, as seen in Col. 12, lines 27-33 and Col. 12, lines 46-60, teaches that the resin is a sheet prior to heating and is made fluid to provide the bonding. It would have been obvious to employ the resin of Tsukagoshi et al '542 in the process of Murakami to provide an alternative resin. Moreover, Tsukagoshi et al teaches that the resin can be initially hard or initially soft depending upon the type chosen.

24. Claim 85 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 and Grupen-Shemansky et al as applied to claim 52 above, and further in view of Tatusko et al. Regarding claim 85, the modified process or method of Murakami, as seen in Col. 4, lines 26-28, teaches that the circuit board is a laminate plate with epoxy-containing material but does not teach the glass cloth or the copper cladding. Tatusko et al teaches that glass cloth can be used in an epoxy circuit board and that the cladding is typically copper. It would have been obvious to employ the glass cloth of Tatusko et al in the board of Murakami to reinforce the board and it would have been obvious to employ the copper to provide a good conducting material.

25. Claims 79 and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 as applied to claims 39 and 58 above and further in view of Tatusko et al (US 3,777,220). Regarding claims 79 and 82, the modified method of Murakami, as seen in Col. 4, lines 26-28, teaches that the circuit board is a laminate plate with epoxy-containing material but does not teach the glass cloth or the copper cladding. Tatusko et al teaches that glass cloth can be used in an epoxy circuit board and that the cladding is typically

Art Unit: 3727

copper. It would have been obvious to employ the glass cloth of Tatusko et al in the board of Murakami to reinforce the board and it would have been obvious to employ the copper to provide a good conducting material.

26. Claims 39-42, 45-48, 54, 58-76, 77, and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eldring (DE 195 35 282) in view of Tsukagoshi et al '542. Regarding claims 39 and 58, to the degree that the claims require that the adhesive is a sheet that is softened by heating to produce bonding, Tsukagoshi et al '542 teaches that the resin can be in sheet form then softened prior to bonding. It would have been obvious to employ the sheet of Tsukagoshi et al '542 in the process of Eldring to provide an alternative form of adhesive since Tsukagoshi et al '542 teaches that either a liquid adhesive or a sheet adhesive can be used to produce the required bonding. See the 102 above with Eldring for the discussion of the remaining claims.

Response to Arguments

27. Applicant's arguments filed 4/25/02 have been fully considered but they are not persuasive. Murakami, as seen in Col. 3, line 23-25, aligns the electrodes. Murakami does not specify what achieves the aligning. It is inherent that the aligning is performed by hand or some other element which satisfies the broad device limitation. Murakami, as seen in Col. 5, lines 46-50, performs the pressing under heating. The heating sets the thermosetting resin. They are performed at the same time. This satisfies the approximately the same time limitation. The

Art Unit: 3727

resin is a solid since it is without internal cavity. (See Merriam-Webster's Collegiate Dictionary, Page 1118 reference enclosed)

28. Applicant's arguments with respect to claims 39-88 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

29. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Watanabe et al and Tsunashima are both cited for teaching circuit board materials and structures.

30. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however,

Art Unit: 3727

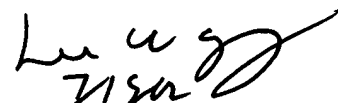
will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

31. In order to reduce pendency and avoid potential delays, Group 3720 is encouraging FAXing of responses in Office Actions directly into the Group at (703) 305-3579. This practice may be used for filing papers not requiring a fee. It may also be used for filing papers which require a fee by Applicants who authorize charges to a PTO deposit account. Please identify the examiner and art unit at the top of your cover sheet. Papers submitted via FAX into Group 3720 will be promptly forwarded to the examiner.

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joe Merek whose telephone number is (703) 305-0644.

Joseph C. Merek/jcm

July 15, 2002

A large, stylized handwritten signature, likely of Joseph C. Merek, consisting of a large loop and a trailing flourish.A handwritten signature, likely of Lee Young, in cursive script.

LEE YOUNG
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700